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DIMENSIONS FOR WROUGHT COPPER
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Indian Standard

DIMENSIONS FOR WROUGHT COPPER AND COPPER ALLOY TUBES

(First Revision)

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Indian Standard

DIMENSIONS FOR WROUGHT COPPER AND COPPER ALLOY TUBES

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 29 May 1981, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1969. In this revision, the tables on tolerances on specified lengths of tubes have been modified.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies dimensions and tolerances for wrought copper and copper alloys in the form of drawn tubes.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Mean Outside Diameter — The mean outside diameter is half the sum of two diameters at right angles of one cross section of the tube.

2.2 Mean Thickness — The mean thickness is half the sum of the thicknesses of two thicknesses measured at two points on a cross section of the tube diametrically opposite to each other.

2.3 Roundness — The difference between major and minor diameters as determined at any one cross section expressed in terms of percentage of specified outside diameter of the tube.

2.4 Tube — A hollow product of uniform cross section having a continuous periphery produced by casting, drawing or extrusion process, also known as pipe.

*Rules for rounding off numerical values (revised).

3. SIZES OF TUBES

3.1 The tubes shall be designated by the outside diameter and wall thickness. The preferred outside diameter and wall thickness of the drawn tubes shall be as given in Table 1.

TABLE 1 SIZES OF TUBES

OUTSIDE DIAMETER IN PREFERRED No. SERIES	WALL THICKNESS mm	LENGTH
2	0.5	Length up to 6.0 metres as specified by the purchaser
2.5	0.5, 0.6	
4	0.5, 0.6, 0.8, 1	
5	0.5, 0.6, 0.8, 1, 1.2	
8	0.6, 0.8, 1, 1.2, 1.5	
10	0.6, 0.8, 1, 1.2, 1.5	
12	0.6, 0.8, 1, 1.2, 1.5	
14	1	
16	0.6, 0.8, 1, 1.2, 1.5	
18	1	
20	0.8, 1, 1.2, 1.5, 2	
22	1, 1.2, 1.5	
25	1, 1.2, 1.5, 2, 2.5	
28	1, 1.2, 1.5	
32	1.2, 1.5, 2, 2.5, 3	
35.5	1.2, 1.5	
40	1.5, 2, 2.5, 3, 4	
50	1.5, 2, 2.5, 3, 4, 5	
63	1.5, 2, 2.5, 3, 4, 5, 6	
80	1.5, 2, 2.5, 3, 4, 5, 6, 8	
100	1.5, 2, 2.5, 3, 4, 5, 6, 8	
125	2, 2.5, 3, 4, 5, 6, 8, 10, 12	
160	2.5, 3, 4, 5, 6, 8, 10, 12	
200	8, 10, 12	
250	8, 10, 12	
315	8, 10, 12, 16, 20	

4. TOLERANCES

4.1 Thickness — The mean thickness of the tube shall not vary from the specified thickness by more than ± 12.5 percent of the specified wall thickness.

4.2 Diameter — The mean outside diameter of the tubes shall not vary from the specified outside diameter by more than the amount of the tolerance specified in Table 2.

4.3 Tubes ordered to be of a specified length shall not vary from the specified length by more than the amount of the tolerance specified in Table 3, when measured at ambient temperature.

4.4 The straightness of the tube shall be determined by measuring the deflection between two points on the surface of the tube at a specified distance and shall not exceed the limit given in **4.4.1**. The deflection is measured between the tube and the straight line joining any two points, distant by one metre, in the plane passing through the axis of the tube.

4.4.1 Tolerances on Straightness — For acceptable straightness of tubes supplied in 'as drawn' condition, permissible maximum deflection shall be 3 mm per metre between any two points on the tube.

TABLE 2 TOLERANCES ON MEAN OUTSIDE DIAMETER

(Clause 4.2)

OUTSIDE DIAMETER SPECIFIED mm	TOLERANCES	
	Normal mm ±	Reduced mm ±
Up to 10	0.08	0.045
Over 10 to 18	0.10	0.045
„ 18 „ 32	0.12	0.055
„ 32 „ 50	0.15	0.070
„ 50 „ 80	0.20	—
„ 80 „ 125	0.25	—
„ 125 „ 200	0.50	—
„ 200 „ 250	0.80	—
„ 250 „ 315	1.00	—

NOTE 1 — For special requirements unilateral tolerances (that is double the normal tolerance) may be agreed between the supplier and the purchaser.

NOTE 2 — Unless otherwise specified the normal tolerances shall apply.

TABLE 3 TOLERANCE ON SPECIFIED LENGTHS OF TUBES

(Clause 4.3)

SPECIFIED LENGTH	TOLERANCE ON SPECIFIED LENGTH, mm	
	As Drawn, Stress Relieved	Annealed to any Temper
Up to and including 5 metres	+2.5	+4.0
Over 5 and up to 7 metres	+3.0	+5.0
Over 7 metres	+4.0	+6.0

NOTE — Minus tolerances are not permissible.

4.5 Roundness Tolerances — The roundness tolerances on the tubes shall be as given in Table 4.

TABLE 4 ROUNDNESS TOLERANCES

t/D^* mm		ROUNDNESS TOLERANCE ON O.D. PERCENT
	0.01-0.03	1.5
Over	0.03-0.05	1.1
"	0.05-0.1	0.8 or 0.05 mm whichever is greater
"	0.1	0.7

* t is wall thickness and D is outside diameter.

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